

CLAIMS

1. A touch panel device comprising:
a touch panel for detecting a touched position; and
a lighting device including a light source, a light guiding part on which light is incident from said light source, and a light guiding and emitting part for guiding light propagated through said light guiding part so as to emit the light as planar light to an outside,

wherein the light to be guided to the outside from said light guiding and emitting part is emitted from a side opposite to a side on which the touched position is to be detected.

2. The touch panel device according to claim 1, wherein said touch panel propagates an ultrasonic wave through an optically transparent substrate and senses a change in a propagation state of the ultrasonic wave due to a touch of an object with said substrate so as to detect a position where the object is touched.

3. The touch panel device according to claim 1, wherein said touch panel senses a change in resistance of a resistance film due to a touch of an object with said resistance film so as to detect a position where the object is touched.

4. The touch panel device according to claim 1, wherein said light guiding and emitting part is a step-like structure

formed on said light guiding part.

5. The touch panel device according to claim 4, wherein a formation direction of the step-like structure forms an angle of not more than 32.5° with respect to a normal direction of a face of said light guiding part.

6. The touch panel device according to claim 1, wherein an optical refractive index of said light guiding and emitting part is not less than an optical refractive index of said light guiding part.

7. The touch panel device according to claim 1, wherein said light guiding and emitting part is a plurality of protrusions formed on said light guiding part.

8. The touch panel device according to claim 7, wherein an optical refractive index of said protrusions is not less than an optical refractive index of said light guiding part.

9. The touch panel device according to claim 1, wherein said light guiding and emitting part is a plurality of grooves formed in said light guiding part.

10. The touch panel device according to claim 9, wherein

a formation direction of said grooves forms an angle of 35° to 55° with respect to a normal direction of a face of said light guiding part.

11. The touch panel device according to claim 1, wherein said light guiding and emitting part is a plurality of prisms formed on said light guiding part.

12. The touch panel device according to claim 2, further comprising an adhesive agent layer for bonding said substrate of said touch panel and said light guiding part of said lighting device together.

13. The touch panel device according to claim 12, wherein, when optical refractive indices of said substrate, said light guiding part, and said adhesive agent layer are indicated by n_1 , n_2 , and n_3 , respectively, the optical refractive indices n_1 , n_2 , and n_3 satisfy the following conditions:

$$n_1 \neq n_3 \neq n_2.$$

14. The touch panel device according to claim 1, further comprising an adhesive agent layer for bonding said touch panel and said light guiding part together.

15. The touch panel device according to claim 14, wherein,

when optical refractive indices of said touch panel, said light guiding part, and said adhesive agent layer are indicated by n_1 , n_2 , and n_3 , respectively, the optical refractive indices n_1 , n_2 , and n_3 satisfy the following conditions:

$$n_1 \neq n_3 \neq n_2.$$

16. A touch panel device in which an ultrasonic wave is propagated through an optically transparent substrate and a change in a propagation state of the ultrasonic wave due to a touch of an object with said substrate is sensed to detect a position where the object is touched, comprising:

a light source for emitting light which is to be incident on said substrate; and

a light guiding and emitting part for guiding the light incident on said substrate from said light source so as to emit the light to an outside.

17. The touch panel device according to claim 16, wherein said light guiding and emitting part is configured so that the light incident on said substrate from said light source is guided and emitted to the outside from a face of said substrate opposite to a face where the touched position is to be detected.